

S/N 10/ 720,409
Applicant Feng Chen
Reply to the Office action dated June 03, 2005

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Remarks/Arguments

Examiner Shakeri is thanked for the thorough Office Action.

In the Claims

Parent claim 1 is amended to include additional limitations. For support see figures 3D, 3E and 3F; See spec p. 13, L 15 to p. 14, L 11.

Claims 2 – 4 are canceled.

Claim 5 is amended. For support see figure 3D, See Spec. p. 13, L 15-21.

Claims 6 and 8 are canceled.

Claim 10 is amended. for support see figure 3E and 3F, and accompanying text on spec p. 14, L 1-11.

Claim 12 is amended. For support see figures 3E and 3F, and accompanying text on spec p. 14, L 1-11.

Claim 13 is amended to correct § 112 issues.

Parent claim 14 is amended. For support see above support for parent claim 1.

Claims 16-18, 20 are canceled.

Claim 19 is amended. For support see parent claim 1, L 6-9.

New Claim 23 is added. For support see figure 3D and accompanying text p. 13, L15 – 21.

New claims 24 and 25 are added. For support see figure 3D and accompanying text p. 13, L15 – 21.

New claims 26 to 29 are added. for support see figure 3E, spec p. 14, L 1- 7.

New parent claim 30 is added. For support see claim 1.

New claim 31 is added. For support see figure 3D and spec p. 13.

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New claims 32 and 33 are added. For support see figure 3E and spec. p 14, lines 1 to 7.

New claims 34 and 35 are added. For support see figure 3F.

New claim 36 is added. For support see claim 1.

DRAWINGS

Drawings 2a-2C are not admitted prior art and should not be designated by a "prior art" Legend.

The instant office action p. 2, states:

1. Figures 2A-2C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Applicant states on page 10 that these figures are not admitted to be prior art, yet on the same page it is disclosed that the present invention is an improvement and that groove 204 traps slurry particles or other debris 208 that cause the problems as discovered by the inventor, thus these rectangular grooves must be prior art for the Applicant to improve upon.

Prior art is defined by 35 USC 102. See MPEP 706.02. Applicant respectfully submits that this patent application is not prior art to itself because nothing in this patent is prior art under 35 USC 102. Figures 2A-2C are not admitted prior art. (See specification p. 10, Lines 2-8.). Figures 2A-2C shows a problem apparently not shown in prior art and is therefore not prior art.

The Office action argues that figures 2A-2C are prior art merely because the applicant's embodiments improve upon figures 2A-2C. However, this

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argument does not meet any of the criteria for Prior art under 35 USC 102. Therefore figures 2A-2C are not prior art.

MPFP 608.02(g) merely states that figures showing Prior art, should be labeled as prior art. Here, Figures 2A-2C do not show prior art and therefore should not have a "Prior art" legend. The examiner is respectfully requested to call the applicant's attorney this explanation is not understood or satisfactory.

The applicant is not requesting that the drawing changes be held in abeyance. Applicant is arguing that the drawing changes are not required. Applicant's applicant should not be ruled abandoned because applicant is not holding changes in abeyance.

Objection to the drawings under 37 CFR 1.83(a).

The instant office action states:

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "groove having cross-sectional areas that change along the length of the groove" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application:

Claim 8 is canceled. Claim 8 is not canceled due to prior art and is not a FESTO limitation. Claim 8 is canceled to reduce issues and speed prosecution.

CLAIM REJECTIONS:

Claim Rejections - 35 USC § 112

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Rejection of claims 13-22 under 35 U.S.C. §112

The rejection of claims 13-22 under 35 U.S.C. §112 is acknowledged. Reconsideration and withdrawal of the rejection is respectfully requested in view of the amendments.

Claim 13

The office Action states:

Regarding claim 13, the language, i.e., "can further comprise" (lines 1 and 2) does not positively recite the elements claimed. Is Applicant claiming other channels and recesses and/or protrusions, or not?

Claim 13 is amended to change "can further comprise" to --further comprises--.

Claim 14

The office action states:

5. Claim 14 recites the limitation "said groove" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 is amended to include antecedent basis for "said groove".

Claim Rejections - 35 USC § 102

Rejection of Claims 1, 5, 7, 8, 10-15, 18 and 21 under 35 U.S.C. 102(e) as being anticipated by Taylor (6,869,335).

The rejection of claims 1, 5, 7, 8, 10-15, 18 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Taylor (6,869,335) is acknowledged.

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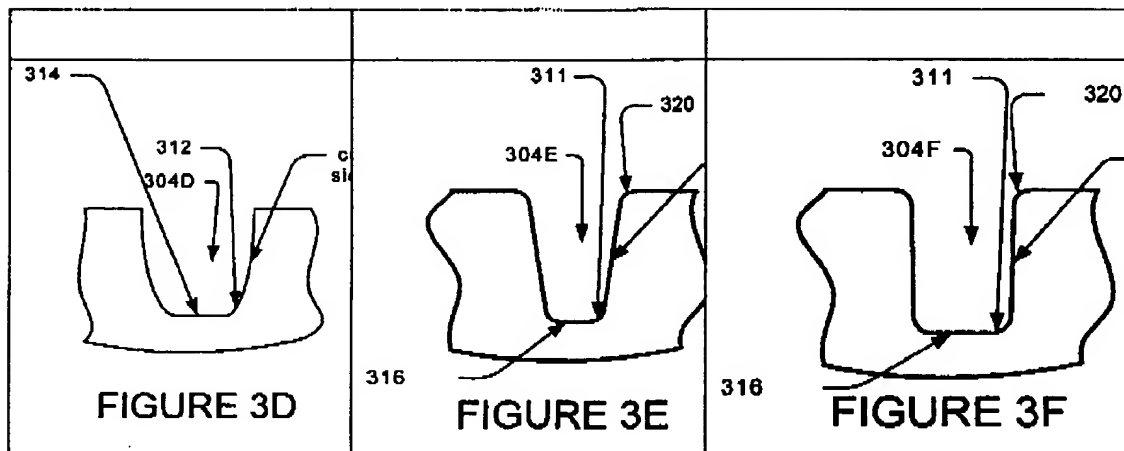
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Reconsideration and withdrawal of the rejection is respectfully requested in view of the amendments and comments below.

Review of Applicant claimed embodiments.

Amended parent claims 1, 14 and 30 contain the non-obvious limitations: "said groove is comprised of: sidewalls, a flat bottom, rounded bottom corners between said sidewalls and said flat bottom."

Non-limiting examples embodiments for these claims are shown below in figures 3D, 3E and 3F.



None of the cited references suggest applicant's

- (1) flat bottom (e.g, 314, 316) and
- (2) rounded bottom corners (e.g., 312 311).

See spec pp. 13 and 14. The rounded bottom corner help prevent slurry particles from sticking in the corners between the flat bottom and the sidewalls. See e.g., figure 2B. See Spec. p. 11, L. 14-16.

The dependent claims add further non-obvious limitations including the shape of the sidewalls.

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Reference Taylor 335.

Taylor teaches rectangular groove with 90 degree non-rounded bottom corners. See Taylor fig 3B. Taylor teaches against the claimed embodiments.

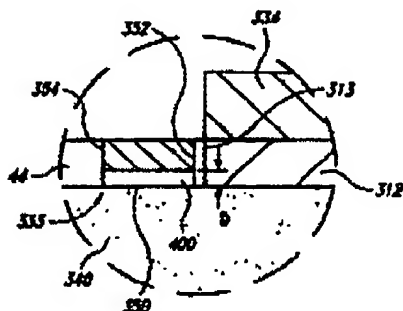


Fig. 3B

Reference Kajiwara et al. 327

Reference Kajiwara et al. 327 teaches semicircular grooves, rectangular grooves and triangular grooves. See figures 13 and 14.

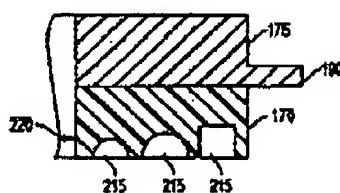


FIG. 13

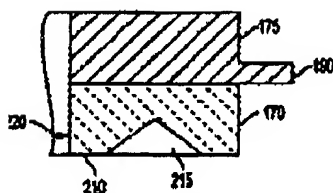
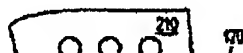


FIG. 14



Kajiwara teaches against the claimed embodiments.

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Amended Claims 1 and 14 are non-obvious

Applicant amended claims 1 and 14 to include additional non-obvious limitation.

1. (CURRENTLY AMENDED) A CMP retaining ring, comprising:
an inner peripheral surface;
an outer peripheral surface;
a lower surface adapted to contact and depress an upper surface of a polishing pad during chemical mechanical polishing of a lower surface of a substrate;
at least a groove on said lower surface of said retaining ring; and said groove extending from a position at or adjacent said inner peripheral surface of said retaining ring, to a position at or adjacent said outer peripheral surface of said retaining ring;
at least a portion of said groove has a rounded contour or slanted contour[.]; said groove is comprised of: sidewalls, a flat bottom, and rounded bottom corners between said sidewalls and said flat bottom.

Claim 14 is amended to include similar limitations.

Claims 1 and 14 are non-obvious over the references because no references or combination of references suggests the limitation of “ said groove is comprised of: sidewalls, a flat bottom, and rounded bottom corners between said sidewalls and said flat bottom.”

For example, neither Kajiwara '327 nor Taylor suggests or shows a groove comprised of rounded bottom corners and a flat bottom. See e.g., Kajiwara '327 figures 5, 7, 9, 10A to 15B. Also see Taylor figure 3B.

No reference suggests the problem (of the slurry particles accumulating in the groove) applicant's rounded bottom corner solves. Therefore there is no motivation to combine the references to meet the claims.

Therefore claims 1 and 14 are non-obvious.

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Claims 5, 7, 8, 10-15, 18 and 21 are non-obvious

The office action states:

Regarding claims 5, 7, 8, 10-15, 18 and 21, Taylor meets the limitations, i.e., rounded top corner adjacent to a lower surface of the ring (contacting the pad); cross-section of groove changing along its length (e.g., Fig. 9); vertical side wall and an about horizontal bottom (e.g., Fig. 3B) with a rounded top corner; plurality of grooves; and wherein the CMP removes materials from a micro-device workpiece.

Claim 5

Amended claim 5 has the following non-obvious limitation not shown in Taylor:

5. (CURRENTLY AMENDED) The CMP retaining ring of claim 1 wherein [said groove has at least one rounded corner.] ; said groove has curved sidewalls with a curved cross sectional shape, rounded bottom corners and a flat horizontal bottom; the rounded bottom corners are between said flat horizontal bottom and said curved sidewalls.

A possible example of a groove of claim 5 is shown in figure 3D.

Claim 5 is non-obvious over Taylor and the combination of other references.

Claim 7

Claim 7 depends from non-obvious parent claim 1.

Claim 8

Claim 8 is canceled. Claim 8 is not canceled because of the prior art. Claim 8 is canceled to reduce prosecution costs and clarify issues for prosecution.

Claim 10.

Claim 10 depends from non-obvious parent claim 1. Claim 10 also contains other non-obvious limitations.

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Claim 11 is canceled

Claim 12

Claim 12 depends from non-obvious parent claim 1. Claim 12 also contains other non-obvious limitations.

Claim 13 is non-obvious

Claim 13 depends from non-obvious parent claim 1. Claim 12 also contains other non-obvious limitations. Claim 13 is non-anticipated by Taylor because Taylor figure 9 shows only one groove. Taylor does not show claim 13's limitation of "a plurality of protrusions and recesses or a mixture of both."

Rejection of Claims 1, 2, 4-6, 8-10, 13-20 and 22 under 35 U.S.C. 102(e) as being anticipated by Kajiwara et al. (6,893,327)

The Rejection of Claims 1, 2, 4-6, 8-10, 13-20 and 22 under 35 U.S.C. 102(e) as being anticipated by Kajiwara et al. (6,893,327) is acknowledged. Reconsideration is rejected in view of the amendments and following remarks.

Claim 1 and 14

Applicant amended claims 1 and 14 to include additional non-obvious limitation.

1. (CURRENTLY AMENDED) A CMP retaining ring, comprising:
an inner peripheral surface;
an outer peripheral surface;
a lower surface adapted to contact and depress an upper surface of a polishing pad during chemical mechanical polishing of a lower surface of a substrate;
at least a groove on said lower surface of said retaining ring; and said groove extending from a position at or adjacent said inner peripheral surface of said retaining ring, to a position at or adjacent said outer peripheral surface of said retaining ring;
at least a portion of said groove has a rounded contour or slanted contour[.]; said groove is comprised of: sidewalls, a flat bottom, and rounded bottom corners between said sidewalls and said flat bottom.

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Claim 14 is amended to include similar limitations.

Claims 1 and 14 are non-obvious over the references because no references or combination of references suggests the limitation of “ said groove is comprised of: sidewalls, a flat bottom, and rounded bottom corners between said sidewalls and said flat bottom.”

For example, neither Kajiwara '327 nor Taylor suggests or shows a groove comprised of rounded bottom corners and a flat bottom. See e.g, Kajiwara '327 figures 5, 7, 9, 10A to 15B. Also see Taylor figure 3B. For example in example figure 3D, No reference suggests the flat bottom section 314 and the rounded bottom corners. Applicant's figure 3D shows an example embodiment of claims 1 and 14.

Kajiwara et al. teaches against the claims. See below figures from Kajiwara that show non-rounded bottom corner and semicircle groove with no flat bottom.

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U.S. Patent May 17, 2005 Sheet 6 of 7 US 6,893,327 B2

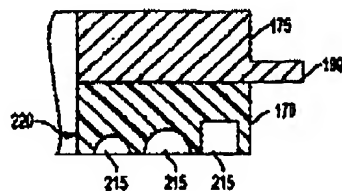


FIG. 13

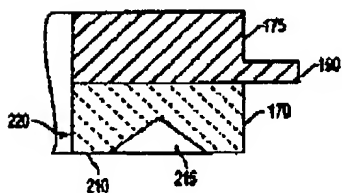


FIG. 14

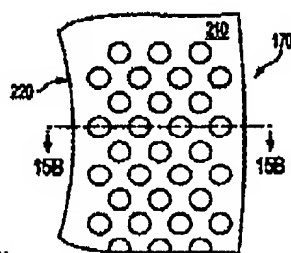


FIG. 15A

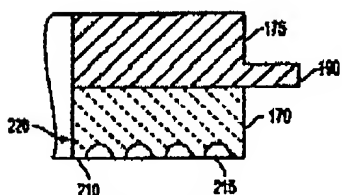


FIG. 15B

Applicant's figure 3D shows an example embodiment of claims 1 and 14.

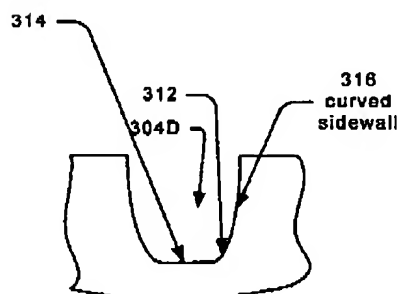


FIGURE 3D

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Therefore claims 1 and 14 are non-obvious.

Claims 2, 4-6, 8-10, 13-20 and 22

The office action on section 8 states:

Regarding claims 2, 4-6, 8-10, 13-20 and 22, Kajiwara et al. meets the limitations, i.e., semicircular profile with radius (depth or width as defined by the instant application, e.g., Fig. 3C) of e.g., 5 mm; rounded bottom corner adjacent to the bottom of the groove; cross-section of groove changing along its length (e.g., Fig. 8); vertical or sloped (e.g., Fig. 14); width of e.g., 5 mm and a depth of e.g., 5 mm (11:08-09); plurality of grooves; and wherein the CMP removes materials from a micro-device workpiece.

Claim 2 is canceled

Claim 4 is canceled.

Claim 6 is canceled.

Claim 8 is canceled.

Claim 9 depends on a non-obvious a parent claim.

Claim 10

Claim 10 depends from non-obvious parent claim 1. Claim 10 also contains other non-obvious limitations.

Amended claim 10 states:

10. (CURRENTLY AMENDED) The CMP retaining ring of claim 1 wherein [said groove has vertical sidewalls or sloped sidewalls.]
said groove is comprised of:
rounded top corners near the lower surface of the ring;
said sidewalls are about vertical and flat.

Applicant's figure 3f shows an example embodiment of claim 10.

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Kajiware does not suggest claim 10's limitations of "said groove is comprised of: rounded top corners near the lower surface of the ring; said sidewalls are about vertical and flat."

Claim 13 depends from non-obvious parent claim.

Claim 14, 15 and 19 are non-obvious

Claim 14, 15 and 19 are non-obvious because they contain similar limitations as in claim 1.

Claim Rejections - 35 USC § 103

The rejection of Claims 2-4, 6, 9, 16, 17, 19, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of Kajiware et al.

The rejection of claims 2-4, 6, 9, 16, 17, 19, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of Kajiware et al. is acknowledged. Reconsideration and withdrawal is respectfully requested in view of the amendments to the claims and following remarks.

The rejection of claims 2-4, 6, 9, 16, 17, 19, 20 and 22 are moot in view of the amendments to the parent claims and depend claims discussed above.

Rejection of Claims 3, 7, 11, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiware et al. in view of Taylor.

The rejection of Claims 3, 7, 11, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiware et al. in view of Taylor.

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Reconsideration and withdrawal is respectfully requested in view of the amendments to the claims and following remarks.

The rejection of claims are moot in view of the amendments to the parent claims and depend claims discussed above. In addition, the combination of reference is improper.

The office action states:

1. Claims 3, 7, 11, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajiwara et al. in view of Taylor.

Kajiwara et al. as described in section 8 meets all of the limitations of the above claims, except for disclosing a rounded top corner (corner contacting the pad).

Taylor teaches the corners of the grooves contacting the pad can be beveled or rounded. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the invention of Kajiwara et al. with semicircular profiles as taught by Taylor to avoid excessive wear of to the pad (Taylor 05:32-34).

Regarding claims 3, 7 and 20, Kajiwara et al. as modified by Taylor meets the limitations, e.g., rounded top corner.

Regarding claims 11 and 12, Kajiwara et al. as modified by Taylor meets the limitations, i.e., rounded top corner for the embodiments of Fig. 1 0B.

Combination of Taylor and Kajiwara is improper

The Combination of Taylor and Kajiwara is improper because it is not obvious to combine. Neither references suggest combination. Neither patent solves the

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same problem. Kajiwara does not attempt to reduce pad wear. This combination can only be done with hindsight.

For these reasons and the reasons give above for the other claim rejections, Claim 3, 7, 11, 12 and 21 are non-obvious.

PENDING CLAIMS

It is believed that all the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper. and the amendment of any claim does not necessarily signify concession of the unpatentability of the claim prior to its amendment.

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CONCLUSION

In conclusion, reconsideration and withdrawal of the rejections are respectfully requested. Allowance of all claims is requested. Issuance of the application is requested.

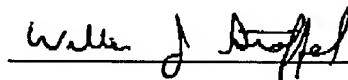
It is requested that the Examiner telephone the undersigned attorney at (215) 670-2455 should there be anyway that we could help to place this Application in condition for Allowance.

Charge to Deposit Account

The Commissioner is hereby authorized to apply any fees or credits in this case, which are not already covered by check or credit card, to Deposit Account No. 502018 referencing this attorney docket. The Commissioner is also authorized to charge any additional fee under 37 CFR §1.16 and 1.17 to this Deposit Account.

Respectfully submitted,

Date: 8/30/05



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